



Knowledge and Practices of Nurses Regarding Catheter Associated Urinary Tract Infection in Tertiary Care Hospitals of Pakistan

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Abstract. Healthcare-associated infection is one of the main risks to patients' safety. Worldwide, the most prevalent hospital acquired illness is catheter-associated urinary tract infection (CAUTI). These healthcare facilities frequently use catheters, and many patients are catheterized for extended periods of time, which raises their risk of developing an infection. With the right training and attention, nurses, who are primarily responsible for caring for urinary catheters, can avoid CAUTI. To evaluate the knowledge of nurses regarding catheter associated urinary tract infection in both private and public tertiary care hospitals. A cross-sectional study was carried out between January and March 2023. A structured questionnaire comprising of 18 items interrelated to demographic details of the respondents, their knowledge and practices regarding catheter infections was administered to 150 nurses. Consecutive sampling technique was used, and data was analyzed through statistical package version 28.0. To determine the correlation between the dependent and independent variables, Pearson chi-square tests were used. Out of 150 nurses making a response rate of 90.2%, the mean age of study participants was 29 (56.7%). The study findings showed that 60% of the nurses had poor knowledge and 40% nurses had poor practice. Lack of understanding existed on the application of practices such using gloves, keeping hands clean while handling catheters, and not detaching the catheter from its bag. Therefore, it is recommended to increase the staff nurses' understanding and practice of catheter care, an educational module on the topic is required.

Keywords: Nurses knowledge · Catheter · Participants

1 Introduction

Healthcare-associated infections (HAIs), which can be brought on by a few effects including insufficient hospital environment and the use of invasive technologies like catheters and probes, are a major concern worldwide. One of the most typical HAIs is Catheter Associated Urinary Tract Infection (CAUTI), which can result in increased mortality and morbidity, prolonged hospital stays with increased expenditures [1, 2]. When a urinary catheter is inserted unnecessarily or remains in the bladder for an extended period, CAUTIs can develop. Indwelling urinary catheters and extraneous equipment are the cause of more than 70% urinary tract infections [3].

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Microorganisms like *E. coli* (21.4%), *Enterococcus* (14.9%), *Pseudomonas aeruginosa* (10%), *Klebsiella pneumoniae* (7.75%), and *Enterobacter* (4.15%) are some of the germs that cause CAUTIs. Female gender, longer catheterization, immune-compromised patients, advanced age, and extended ICU stay were the risk variables linked to CAUTIs [4, 5]. CAUTIs can result in a variety of complications, including bloodstream infections, endocarditis, endophthalmitis, meningitis, prostatitis, epididymitis, bladder spasm, and orchitis in males [6]. The frequency of CAUTI is 12.9% in United States, 19.6% in Europe, and 24% in the developing countries, respectively [7].

Nurses are the fundamental healthcare professionals in responsibility of placing and maintaining urinary catheters, as well as generating the intended results by observing to the established protocols, rules, and standards [8]. The findings showed that factors like the presence of procedures and protocols in the medical facility have a promising influence on nurses' knowledge and practice regarding CAUTI prevention [9]. In the developing countries, the occurrence of CAUTIs nearly ranged from 10 to 35 per 1000 patients [10]. The data regarding knowledge and practice of nurses towards CAUTIs are limited. Therefore, this study designed to assess the knowledge and practice of nurses towards prevention of CAUTIs in the different hospitals of Pakistan.

2 Methods and Materials

2.1 Study Settings and Period

A descriptive, cross-sectional study carried out, to assess the knowledge and practice of nurses regarding catheter associated urinary tract infection (CAUTI). The Study was conducted from January to March 2023 in three tertiary care hospitals of Rawalpindi and Islamabad. Which includes two public and one private hospital, namely, Pakistan Institute of Medical Sciences, Benazir Bhutto Hospital and Rawal General and Dental Hospital.

2.2 Study Design and Population

Between January 1 and March 25, 2023, a cross-sectional institutional study involving nurses' workings in the intensive care area of hospitals were selected. The study included all critical area nurses from each hospital who were available throughout the time of data collection. Nurses who were seriously ill or on maternity leave were not eligible.

2.3 Sample Size and Sampling Procedure

The researchers considered choosing a sample size from the entire community that was asked to participate in this study due to the relatively large population of potential participants and time constraints. The EpiCalc Programme version 2000 was used to calculate the sample size. 150 tertiary care hospital nurses were chosen for the final sample. Non-Probability sampling technique was applied to select the sample size from tertiary care hospitals, after obtaining permission from the selected settings.

2.4 Data Collection Tool and Techniques

Based on Comprehensive Review of previous study, a self-Administered questionnaire was adopted by the researcher. The questionnaire was divided in to two Sections as follow:

Section one. The socio-demographic characteristics of the participants: Age, Sex, Level of Education, and Year of experience.

Section Two. Knowledge and practice of nurses regarding catheter associated urinary tract infection. The questionnaire consists of 13 questions.

By using the face validity method, the questionnaire was validated. Cronbach alpha was determined to assess the tool's dependability, and the result was 0.77, which is within acceptable bounds.

2.5 Validity and Reliability of the Tool

Three experts evaluated the questionnaire's validity. Only registered nurses were used as experts, and the researchers used the Patient Safety Guide (GPS) as a comprehensive study instrument with the assistance of literature supervisors. Using Chi-square, the questionnaire's validity was evaluated. Prior to data collection, the piloting questionnaire was completed. Five practising nurses participated in a pilot study to evaluate the questionnaire's clarity, feasibility, and shortcomings.

2.6 Data Processing and Statistical Analysis

The Statistical Package for Social Science (SPSS) version 28.0 was used to analyse the obtained data after it had been coded, categorised, and imported into Epi-data Version 4.6.0. The mean, standard deviation, and frequency percentages were used to express descriptive findings. It was determined whether there was a significant correlation between the independent and outcome variables by using the chi-square test. A P-value of 0.05 or lower was used to determine the degree of significance.

2.7 Ethical Consideration

Before initiating the data collection for study, an approval was obtained from institutional review board of the institute. Participants were informed of the study's benefit and aim. All the study's participants provided their consent. Additionally, all nurses were free to decline or leave the research.

3 Results

3.1 Socio-demographic Characteristics of Nurses

A total of 150 nurses participated in the study making a response rate of 90.20%. Among most of them 60% were females. The mean (+SD) age of study participants was 29.7. The majority of 85(56.7%) of the study participants were in the age group of 20–35 years. More than half 80(53.3%) were head nurses who had adequate knowledge. 87(58%) had 5–6 Years' work experience. Nearly one-third (35.9%) of the study participants have 6–10 years' work experience as shown in Fig. 1.,(Table 1).

Table 1. Total nurses

Total Nurses	150
Response rate	90.20%
Mean Age	29%
Knowledge	60%
Practice	30%

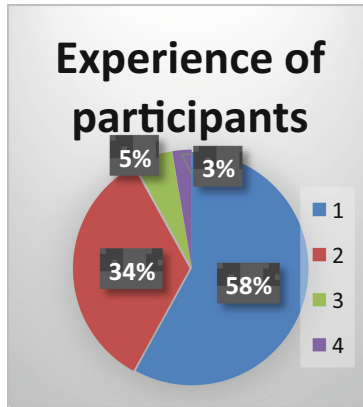


Fig. 1. Nurses experiences

3.2 Knowledge and Practices of Nurses Towards Prevention of CAUTIs

According to the study’s findings, around 67.3% of respondents said their hospitals have effective teams dedicated to CAUTI prevention. 65.3% of nurses routinely provide comments on prevalence, infection, and catheter use. The catheter that is frequently placed in the emergency room without the proper justification was acknowledged by 68.7 percent of respondent as shown in Fig. 2 (Table 2)

4 Discussion

The current study’s objective was to evaluate nurses’ clinical expertise and understanding of catheter associated UTIs. The findings of this study were based on primary data collected from 150 nurses to evaluate their practise and knowledge. Nurses, whose knowledge and practise affect patients’ health outcomes, oversee preventing CAUTI. In order to achieve the best results when inserting the catheter for the follies, nurses are regarded as the primary healthcare practitioners. CAUTI is one of the most common infections linked to medical care. Limiting catheter use is the most crucial prophylactic measure in lowering the incidence of CAUTI. The management of issues related to CAUTI, and incorrect catheterization might benefit from evaluating the knowledge of health care professionals regarding catheterization and urinary tract infection (UTI),

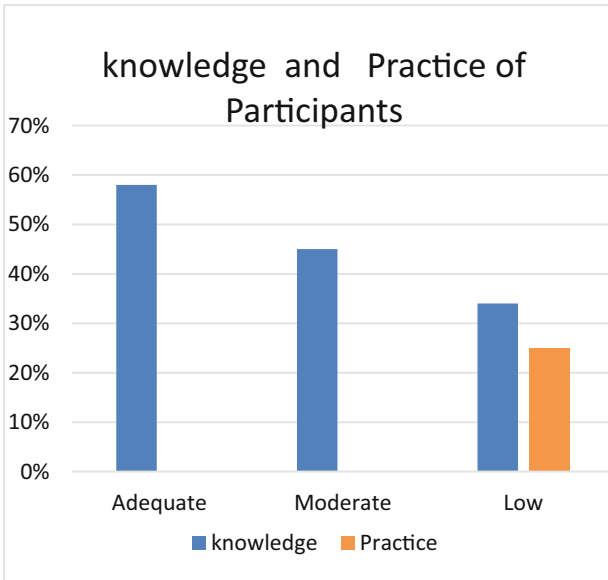


Fig. 2. Knowledge and practice of participants

particularly nurse knowledge. One of the main health issues facing the world today is catheter-associated UTI, which puts a tremendous strain on the healthcare system. It is anticipated that nurses will be heavily involved in CAUTI's prevention [11].

According to the findings of our study, 40.9% of nurses were female and between the ages of 20 and less than 25. the majority of people have a diploma and have one to five years of experience. 51% of nurses had taken CAUTI training classes. This may be because all the courses are taught in English and the bulk of them have nursing degrees. There is still more of a reason why people lack knowledge. In comparison to research done in India (86.5%), this outcome was lower [12]. The plausible explanation could be due to differences in socioeconomic position, the degree of development of the health sector, the study environment, the study design, and the rating technique utilised. On the other side, this study's conclusion was more favourable than that of the Pakistani study (49%) [13]. The reason behind this difference might be difference in study setting and the difference in instrument (tool) used to assess nurses' practice towards prevention of catheter associated urinary tract infection.

A multivariate logistic regression study revealed that factors like sex, job experience, a positive attitude, and expertise were substantially associated with how nurses practised preventing catheter associated UTIs. This study found that nurses' level of practise and knowledge are not statistically related (P-value = 0.450). This result is consistent with a study carried out in the city of Iloilo, Philippines [14]. This similarity may be explained by the adoption of identical study designs and the low levels of practice and knowledge of nurses in both studies. However, there was a statistically significant correlation between nurses' degree of knowledge and professional work experience in the current study (P-value = 0.031). The findings of the current study showed that most

Table 2. Nurses showing the self-reported level knowledge and practice questionnaire

Items	Yes N(%)	No N(%)
When do you perform hand hygiene?	145 (78.8%)	39 (21.2%)
Hand washing before catheter manipulation	150 (81.5%)	34(18.5%)
Hand washing after catheter insertion		
Hand washing before and after catheter insertion	116 (63%)	68 (37%)
Do you currently have a well function team (or work group) focusing on (CAUTI) prevention?	67.3% (101)	32.7% (49)
Do you have a project manager with dedicated time to coordinate time your (CAUTI) Prevention Activities?	69.3% (98)	30.7% (52)
Do you have an effective nurse champion for your (CAUTI) Prevention Activities?	68.7% (101)	31.3% (49)
Do bedside nurses assess, at least daily, whether their catheterized patient still need a urinary catheter?	67.3% (101)	32.7% (49)
Do you have an effective physician champion for your (CAUTI) Prevention Activities?	65.3% (103)	34.7% (47)
Do you currently collect CAUTI-Related data (e.g. urinary catheter prevalence, urinary catheter appropriateness's, and infection rates) in the unit in which you are I intervening?	62.7% (104)	37.3% (48)
Is senior leadership support of CAUTI prevention activities?	65.3% (98)	34.7% (52)
Do you routinely feedback CAUTI-Related to front line staff (e.g. urinary catheter prevalence, urinary catheter appropriateness's, and infection rates)	65.3% (98)	34.7% (52)
Have you experienced any of the following barriers?	67.3% (104)	34.7% (46)
A. Sustained nursing resistance		
B. Sustained physician resistance	65.3% (94)	32.0% (56)
Patient and family request for an indwelling urinary Catheter	62.7% (101)	31.3% (48)
Indwelling urinary catheter commonly being inserted in the emergency department without an appropriate indication?	68.7% (101)	32.7% (48)

nurses had appropriate levels of CAUTI preventive knowledge. This result contradicts Selim, El-Seoud, Mohamed and Ibrahim [15], who found that a large percentage of nurses had demonstrated a good implementation of various practices towards catheter CAUTI prevention.

5 Limitations

The study had a few drawbacks. A cross-sectional study was mostly used, and it failed to demonstrate a causal connection between study variables. The study was unable to see the actual nurses' CAUTI preventive practices in action. Finally, because there are fewer hospitals, the study's results cannot be applied generally.

6 Conclusion

In this study, there was a rather low level of knowledge and practice among nurses about catheter-associated UTI prevention. The level of knowledge regarding CAUTI prevention was statistically significantly correlated with the professional work experience of nurses. Continuous Nursing Education sessions are required to upgrade the information of nurses.

7 Implication for Nurses

We suggested that nursing staff members should receive more training and instruction about how to minimize device-associated infections and avoid the need for unused urinary catheters. Additionally, we proposed that larger sample sizes be used in future studies to examine the variables influencing nurses' knowledge and practice about catheter-associated UTI prevention.

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Availability of data and materials.

The manuscript contains all the information needed to support the study's findings. On reasonable request, the corresponding author will provide more in-depth information and raw data.

Ethics approval and consent to participate.

Ethical clearance was granted from Rawal Institute of Health Sciences, Ethics Review Committee. Written Informed consent was taken from.

the study members and privacy of the data was ensured throughout the course of data collection.

Declarations.

Competing Interests. The authors declare that they have no competing interests.

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